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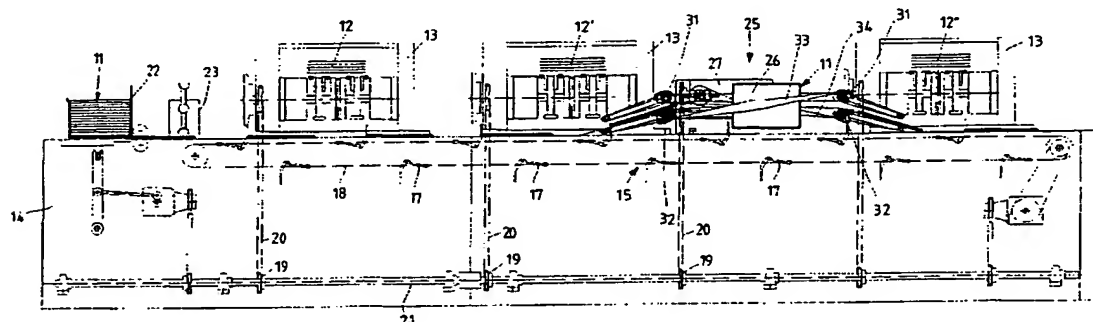
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(54) **Device for turning an editorial product on a packaging line**

(57) A device for turning an editorial product on a packaging line comprising a pusher conveyor (15, 16, 17), a feeder (22) for products (11) to be packaged, and a plurality of feeders (13) for sheet inserts (12, 12', 12'') for the products (11), arranged side by side one after another along a direction essentially perpendicular to the pusher conveyor, the device comprising a base (27)

on which there is mounted a unit (31, 32; 29, 30; 33, 34) gripping, rotating, overturning through 180° and guiding the products caused to advance by the pusher conveyor, and for depositing the thus turned products onto the conveyor, the base having an overall size identical to that of one of the insert feeders (13) so as to be able to replace it in its position within the line, drive means (19, 20) being provided for the said unit.



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## Description

This invention relates to a device for turning an editorial product on a packaging line.

On packaging lines or machines for flat graphic or editorial products such as sheets, signatures, magazines, brochures etc., it is nearly always necessary to be able to associate further sheet elements, generally defined as inserts, with these products.

Moreover, these inserts have to be located in correspondence with a particular position or side of the product according to their importance and according to the type of impact which they are required to have on the purchaser of the finished package, complete with the relative inserts.

Consequently, a separate device for overturning the product is associated with the end of the packaging line and aligned therewith. In this manner the overturned product is fed towards a second packaging line on which every additional insert is combined with a different side of the product, before passing to the unit for its packaging within a plastics film or a suitable paper sheet.

This type of procedure does not satisfy the requirement of feeding such inserts in a certain number onto different sides of a base product as additions thereto, at a high operating rate. It also requires the use of a number of lines and devices, with considerable capital expenditure and consequent costs.

On the other hand, up to the present time single packaging lines have used only the so-called drum feeders which are positioned to the side of the line pusher conveyor to feed the individual inserts only onto the editorial base product in the position in which it is fed. This results in the aforesaid drawbacks.

An object of the present invention is to feed sheet inserts in the most rapid manner possible towards different sides of a product to be packaged, within the same packaging line or machine.

A further object is to correctly achieve this feed after a predetermined number of inserts have already been fed, this number being variable and predetermined on the basis of the particular requirements of the client ordering the package.

These objects are attained according to the present invention by a device for turning an editorial product on a packaging line comprising a pusher conveyor, a feeder for products to be packaged, and a plurality of feeders for sheet inserts for said products, arranged side by side one after another along a direction essentially perpendicular to said pusher conveyor, said device being characterised by comprising a base on which there is mounted a unit for gripping, rotating, overturning through 180° and guiding said products caused to advance by said pusher conveyor, and for depositing said thus turned products onto said conveyor, said base having an overall size identical to that of one of said insert feeders so as to be able to replace it in its position within said line, drive means being provided for said unit.

The characteristics and advantages of a device for turning an editorial product on a packaging line according to the present invention will be more apparent from the description thereof given hereinafter by way of non-limiting example, with reference to the accompanying schematic drawings, in which:

Figure 1 is a schematic side elevation of a device according to the present invention inserted into a packaging line to the side of a pusher conveyor; Figure 2 is a plan view of Figure 1 from above, some parts being removed to facilitate comprehension; Figure 3 is a partly sectional enlarged plan view from above of a detail of Figure 2, showing the device of the present invention; Figure 4 is an enlarged side elevation of the detail of Figure 3, but without the product inserted vertically between the belts as shown in Figure 1; and Figure 5 is a plan view of a further embodiment of insertion elements within the device.

With reference to Figures 1 and 2, these show very schematically a packaging line for flat graphic and editorial products, such as double-sided sheets, signatures, magazines, brochures etc., indicated by 11.

There is nearly always the requirement of being able to associate with these products further sheet elements known generally as inserts, and indicated by 12, 12', 12" etc. The inserts 12, 12', 12" are fed by a certain number of feeders, such as drum or other feeders 13, usually positioned to the side of the packaging line. In the case of drum feeders 13, these are positioned on a general support structure 14 to the side of a conveyor 15 composed of a support and guide surface 16, possibly in the form of a channel, on which there slide a plurality of pushers 17, driven for example by an underlying endless flat chain 18. The surface 16 of said conveyor 15 is hence able to receive a series of sheet inserts 12, 12', 12" originating from the lateral drum feeders 13, which in the illustrated example are three in number.

The drum feeders 13 are driven by chains 20 and relative gears 19 positioned on an underlying central transmission shaft 21 able to synchronously drive nearly all of the devices of the packaging line or machine. In this respect, the transmission shaft 21 also drives a vertical magazine feeder 22 for the products 11, which is positioned at the initial end of the line, where the base products are inserted.

Downstream of the magazine feeder 22 there is positioned a device 23 for opening the first page 24, known as the first cover side, of the editorial product 11. The product maintained open in this manner is then fed in front of a first drum feeder 13, where it receives a first insert 12 below the first page 24. The same procedure can then take place in correspondence with the second drum feeder 13 for a second insert 12'.

On the packaging line or machine there is also located a device for turning an editorial product, formed

in accordance with the present invention and indicated overall by 25.

It will be noted that advantageously, according to the present invention, the device 25 for turning a product 11 overturns the advancing products while maintaining their direction of travel and the pitch set for the packaging line unaltered.

The reason for this is to make it subsequently possible to deposit further inserts, for example 12", below or above the upper face of the overturned product. The terms used for these sides are the "third cover side" for the upper inner side and the "fourth cover side" for the upper outer side of the overturned product, indicated on the figure by 26.

The device 25 comprises a base 27 having the same maximum dimension as the insert feeder or drum feeder 13, and hence able to be inserted into a space corresponding to it.

The base 27 carries a gripping, rotating, 180°-turning and guiding unit for products 11 caused to advance by the pusher conveyor 15, in order to again deposit them inverted or turned on the conveyor. The unit comprises four shafts 28 of horizontal axis, which act as fulcrums and support four arms 29 positionable by rotation according to requirements, the position of some or all the shafts 28 being height-adjustable. Each arm 29 carries at its free end, on a further shaft 30, a rotatable idle roller 31 or motorized roller 32. The rollers on the upper arms 29 are idle and are indicated by 31, whereas those on the lower arms 29 are motorized and indicated by 32. Each pair of rollers 31 and 32 supports and accompanies the movement of a relative conveyor belt 33 and 34 which turns about itself through 180°. In this manner the belts 33 and 34 face each other, they turn about themselves through 180°, and their opposite ends are aligned with the pusher conveyor. Specifically, the first belt 33 extends, in the direction of movement of the products, from a motorized lower roller 32 to an idle upper roller 31, and the second belt 34 extends from an idle upper roller 31 to a motorized lower roller 32.

The rotary movement is transmitted to the belts 33 and 34, or to the rollers 32, by transmissions 39 which derive their movement from pulleys positioned on the shafts 28 which are driven by a further transmission 40. The transmission 40 is driven by a bevel gear pair 41 operated by a chain 20 driven by a gear 19 rigid with the underlying central shaft 21.

The shafts 30, projecting from the arms 29, also carry pairs of pulleys 35 located on opposite sides of the rollers 31 and 32, about which there extend portions of further pairs of smaller-dimension upper and lower belts 36 which face each other and are directed outwards from the device in the conveying direction of the products 11. The belts 36, which are also driven by the rotation of the shafts 30, form elements for the insertion of the products into the said device.

By means of the device of the present invention, the upperly positioned first page or first cover side 24 of the

products 11 becomes positioned lowerly. Simultaneously the fourth page or fourth cover side 26, which was positioned lowerly, becomes positioned upperly. The provision of belts 33 and 34 arranged in this manner to grip between them the product and relative inserts located in it enables it to be overturned according to requirements without allowing the inserts contained within it to escape.

In this manner, a further insert 12", fed by a third drum feeder 13 in the embodiment illustrated in Figures 1 and 2, can be deposited onto the fourth cover side 26. This happens if the product 11, already containing possible inserts 12, 12', is simply rotated through 180° by the device of the present invention. Alternatively, if a further device for opening the fourth page 26 of the editorial product 11 is provided similar to that already indicated by 23, the insert 12" becomes positioned below the third page or third cover side, not shown.

The same can be achieved for further inserts by providing further drum feeders 13.

To facilitate the positioning and feeding of the products 11 between the belts 36, a sheet metal or similar guide 37 is provided smoothly connecting the conveyor 15 to the interior of the belts 36. Indeed, the belts 36 could be dispensed with, see Figure 5, and be replaced by simple sheet metal guides 38 starting from the conveyor 15 and extending into proximity with the belts 33 and 34 which form the unit for gripping, rotating, overturning and guiding the products received in this manner. In this manner the position of the device can be chosen to determine the number of inserts to be inserted before and/or after the turning or overturning of the fed products.

A device in accordance with the present invention hence enables the movement of the products within the packaging liner or machine to be utilized to achieve turning or overturning of the products and to directly insert the required inserts. Moreover these inserts are positioned where specifically requested and in the number chosen by the applicant requesting the packaging.

Besides achieving a greater operating speed of the entire line or machine, this particular arrangement enables the desired number of insert feeders or drum feeders to be provided and the turning device to be positioned in the required position where product turning is necessary. In this respect, the overall size of the device of the invention is such that it can be positioned anywhere as simple replacement for an insert feeder or drum feeder without any adaptation, but by simple mechanical positioning and connection to the central control members.

Providing a power take-off from the machine or line central shaft 21 enables complete and constant phasing to be achieved between the products and inserts on a single machine, even at high speed.

The connection to a central shaft 21 hence mechanically achieves synchronized movement of the various elements and various devices, with correlation between

their peripheral speeds.

in synchronism with said pusher conveyor (15).

## Claims

1. A device for turning an editorial product on a packaging line comprising a pusher conveyor (15, 16, 17), a feeder (22) for products (11) to be packaged, and a plurality of feeders (13) for sheet inserts (12, 12', 12'') for said products (11), arranged side by side one after another along a direction essentially perpendicular to said pusher conveyor, said device being characterised by comprising a base (27) on which there is mounted a unit (29,30; 31,32;33,34) for gripping, rotating, overturning through 180° and guiding said products (11) caused to advance by said pusher conveyor, and for depositing said thus turned products onto said conveyor, said base having an overall size identical to that of a base of said insert feeders (13) so as to be able to replace it in its position within said line, drive means (19, 20) being provided for said unit.
 

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2. A device as claimed in claim 1, characterised in that said gripping, rotating, 180°-overturning and guiding unit comprises a pair of mutually facing belts (33, 34) which turn about themselves through 180°, their opposite ends being aligned with said pusher conveyor (15).
 

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3. A device as claimed in claim 1, characterised in that said drive means of said device consist of a chain (20) and a gear (19) which connect it to a central transmission shaft (21) of said line.
 

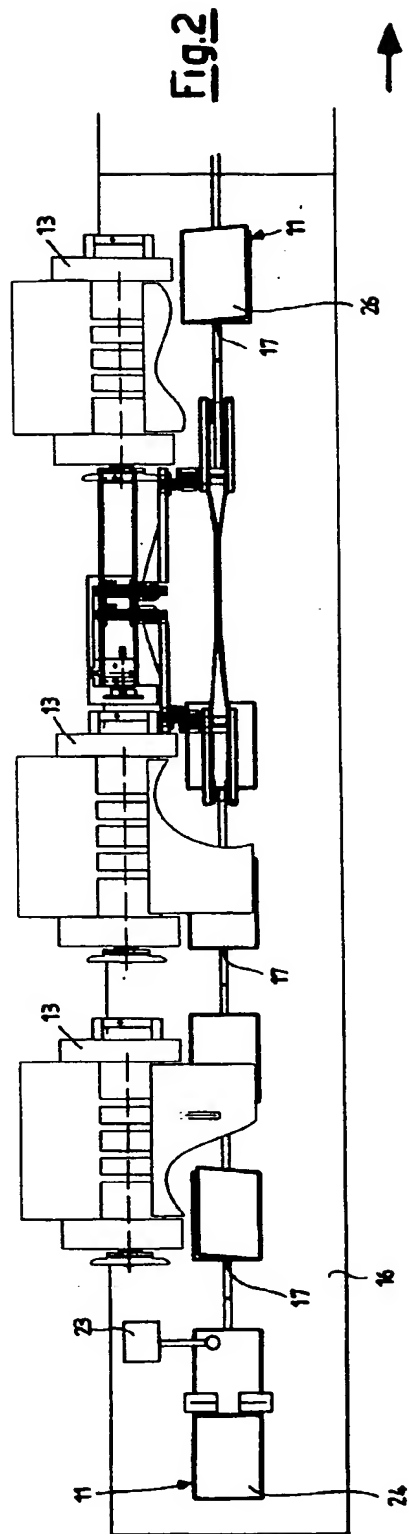
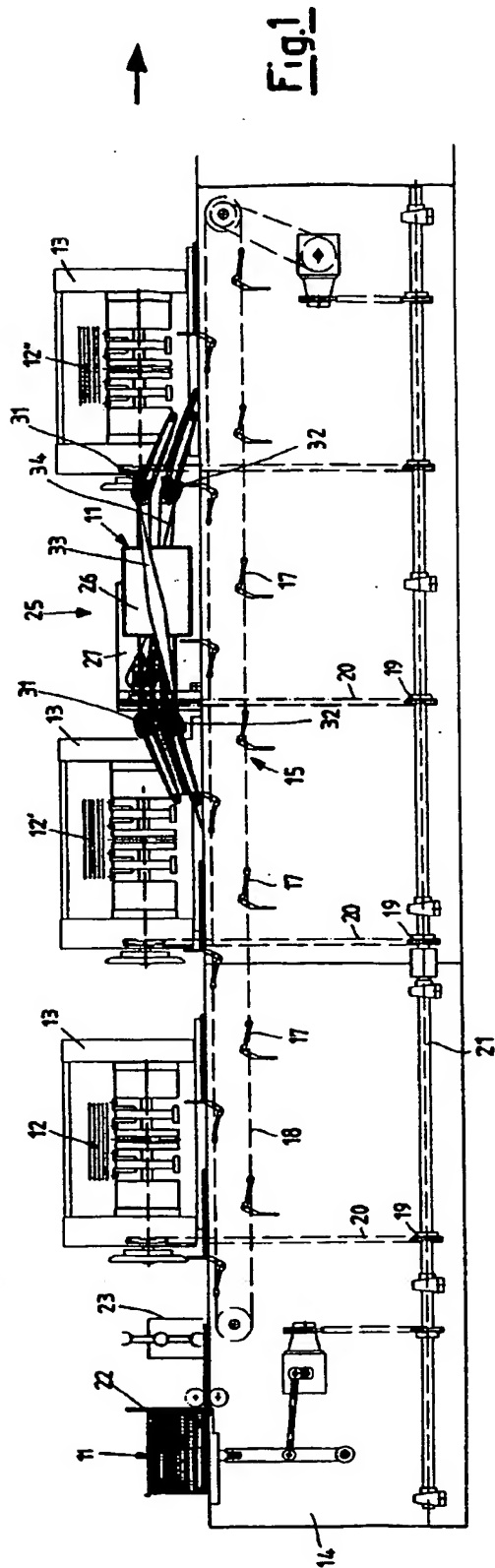
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4. A device as claimed in claim 1, characterised in that downstream of said device there are provided elements (37, 36; 38) for insertion into said device.
 

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5. A device as claimed in claim 4, characterised in that said insertion elements comprise a pair of mutually facing upper and lower belts (36) driven synchronously with the conveyor (15).
 

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6. A device as claimed in claim 4, characterised in that said insertion elements comprise a smoothly connecting guide (38) between said unit and said pusher conveyor.
 

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7. A device as claimed in claim 2, characterised in that said pair of mutually facing belts (33, 34) pass about respective rollers (31, 32) positioned rotatably in proximity to one end of arms (29) pivoted (at 28) to the other end of said base (27).
 

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8. A device as claimed in claim 7, characterised by comprising transmissions (20, 41, 40, 39) which control the peripheral speed of said belts (33, 34)
9. A device as claimed in claim 7, characterised in that said pivoted (at 28) arms (29) are adjustable in position.



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Fig.3

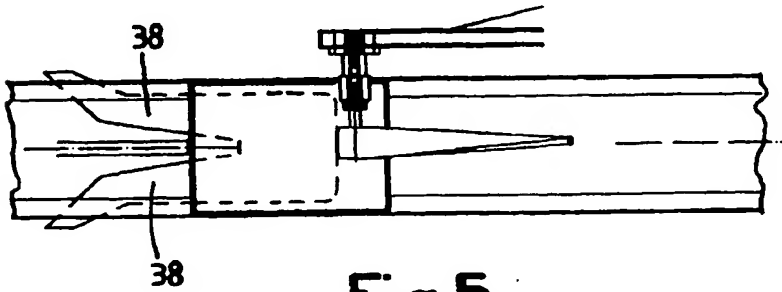
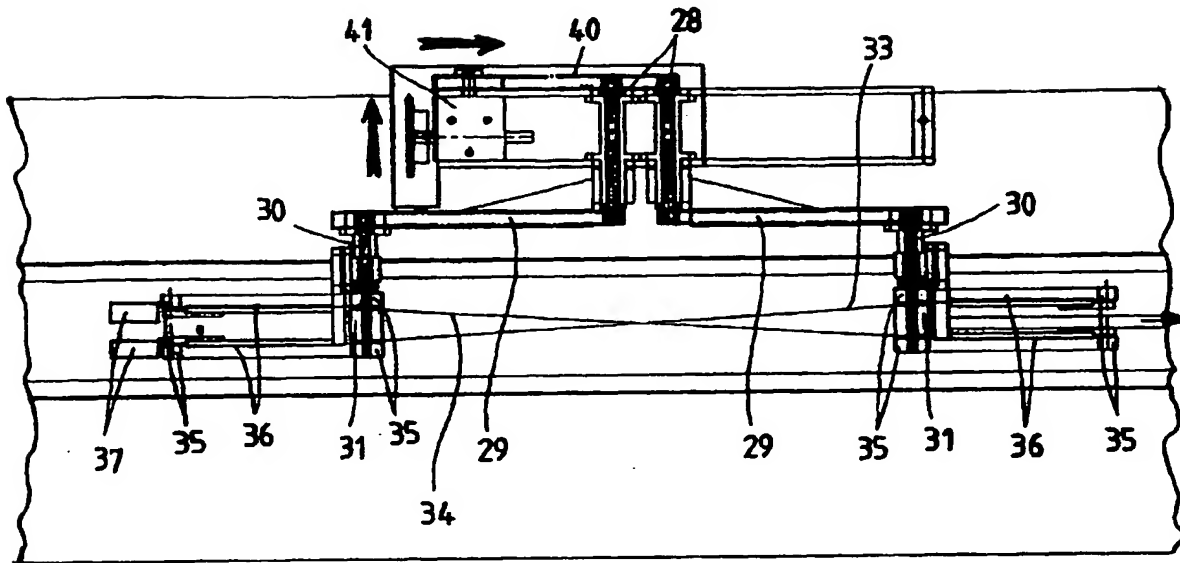
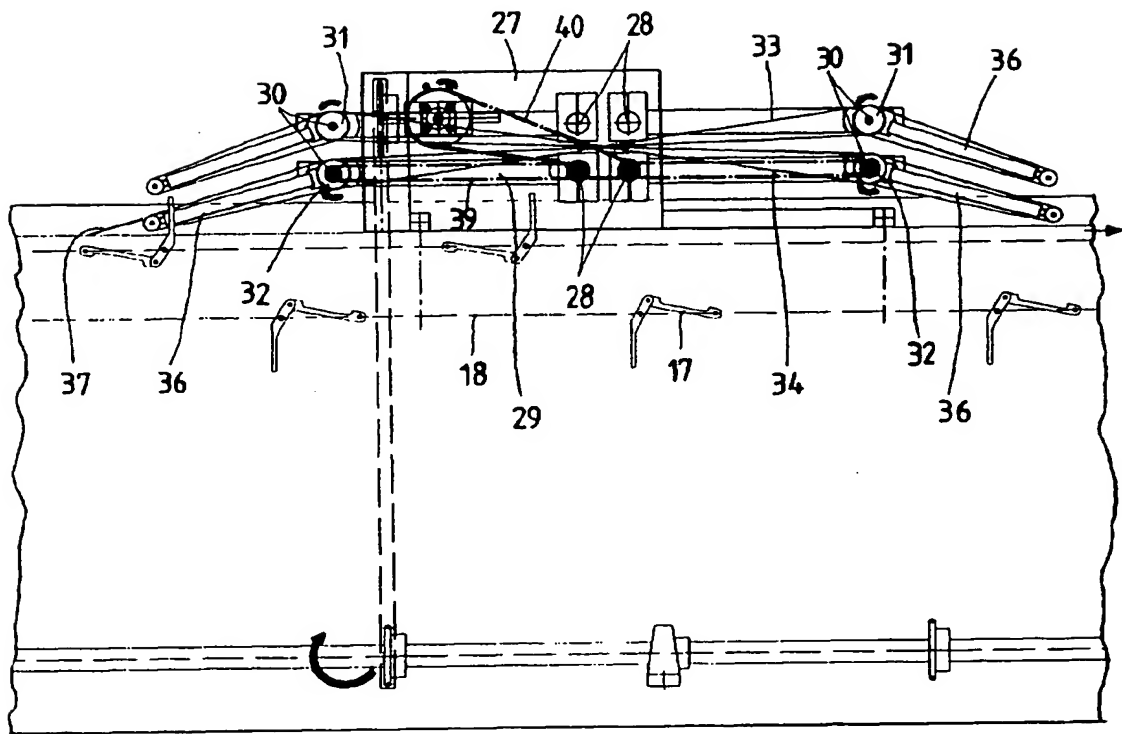


Fig.5

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Fig.4





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# EUROPEAN SEARCH REPORT

Application Number  
EP 97 20 2085

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	EP 0 627 376 A (R.R. DONNELLEY & SONS) 7 December 1994 * the whole document *	1-10	B65H15/00
A	DE 86 15 853 U (H. WOHLBERG KG GMBH & CO) 6 November 1986 * the whole document *	1-10	
A	EP 0 240 691 A (GRAPHIA HOLDING AG) 14 October 1987 * the whole document *	1-10	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			B65H
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 22 October 1997	Examiner Henningsen, O
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons &amp; : member of the same patent family, corresponding document</p>			

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